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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/594,475
Filing Date: September 28, 2006
Appellant(s): OHTA ET AL.

John W. Fitzpatrick
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 13, 2010 appealing from the Office action mailed January 27, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Co-pending application U.S. 10/594,635.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1, 2, 7 and 9.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the

subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

2004/015050	Pasqualoni et al.	08-2004
6,248,144	Tamai et al.	06/2001
2004/0127047	Yamada et al.	07-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/015050 to Pasqualoni et al. in view of U.S. Patent No. 6,248,144 to Tamai et al. and further in view of U.S. Patent Application Publication No. 2004/0127047 to Yamada et al.

Pasqualoni et al. teach a polishing composition comprising 10 weight percent fumed silica (i.e. is to be noted that this is a preferred amount), an acidic component, and a basic component (i.e. ammonium hydroxide) (Abstract; [0024]-[0025]). With reference to coarse particles, Pasqualoni et al. disclose a large particle count of preferably about 25 to about 150,000 particles having a particle size greater than about 0.5m in about 30 μ L (i.e. about 416 particle to 250,000 particles per 0.5 ml) (Abstract; [0024]). Additionally, the reference discloses the use of fumed silica in a concentration of about 4% to about 10% ([0025]). Furthermore, the reference discloses that in order to further enhance the chemical activity of the composition, additionally chemicals *may* be added such as surfactants, corrosion inhibitors, stabilizing agents such as potassium hydroxide, and acids such as sulfuric acids ([0037]-[0044]).

It is to be noted that the reference teaches an overlapping range of particle count for large particles (i.e. coarse particles) with the ones instantly claimed, and overlapping ranges have been held to establish *prima facie* obviousness. MPEP 2144.05.

Although Pasqualoni et al., in paragraph [0035], may appear to disclose the use of an oxidizer, it is to be noted that the use of said compound is made optional by clearly stating that “The slurry composition of the present invention *may* further comprise an oxidizer”.

This reference is silent as to the bulk density of the fumed silica and the processing conditions used to make the slurry. Additionally, this reference does not expressly and/or literally disclose an average particle size for the fumed silica particles.

With respect to the bulk density, this is obvious motivated by the fact that the Tamai et al. teach beneficial reasons to make a polishing composition by using fumed silica with their claimed bulk density of at least 70 g/L (column 4, lines 7-23).

Although Pasqualoni et al. may not expressly and/or literally disclose an average particle diameter of the particles of fumed silica, the reference clearly discloses the use of fumed silica as abrasive particles. An average particle size for fumed silica as that claimed instantly or an overlapping range such as 5 to 30 nm would have been obvious to a person ordinary skill in the art motivated by the fact that smaller particle sizes such as 5-30 nm are known to prevent an increase in haze and prevent an occurrence of scratches during polishing as that shown and evidenced by Yamada et al. ([0007], [0027]). It should be noted that the disclosure of Pasqualoni et al. on the count of large particle size clearly shows that the reference is aiming at obtaining small particle sizes.

With respect to the process limitations (i.e., mixing an alkali aqueous solution with an acidic solution, as is apparent from the claims, Pasqualoni et al. clearly teaches these, however, assuming arguendo, applicants use process limitations to define the product and "product-by- process" claims do not patentably distinguish the product even though made by a different process. *In re Thorpe* 227 USPQ 964.

Assuming arguendo about the limitations "alkali solution" and "acidic solution", it is to be noted that the primary reference uses both an acid and a base in the composition, and although not designated as both being "solutions", this is immaterial because the composition will still contain an acid, base and water, irrespective of the acid and base being initially in solution or not. Thus, the burden is shifted to Applicants

to establish why the reference fails to read on the above limitations or the final polishing composition.

(10) Response to Argument

Appellants have argued that Pasqualoni et al. relates to Chemical Mechanical Polishing slurry composition used for polishing metals that includes a dispersion solution comprising water and oxidizer.

The Examiner disagrees and, respectfully, submits that Pasqualoni et al. in paragraph [0035] clearly discloses that the use of oxidizers is optional by stating that "The slurry composition of the present invention *may* further comprise an oxidizer". Furthermore, Pasqualoni et al. clearly teach that their invention of a chemical mechanical polishing slurry may be used in semiconductor manufacturing in paragraph [0003].

Appellants have argued that Pasqualoni et al. disclose a polishing composition which includes course particles far in excess of a range of 66,595/0.5 ml to 112,453/0.5 ml, and that the disclosure of "a large particle count of about 25 to about 150.000 particles having a particle size greater than 0.5 µm in 30 µl of slurry" equates to 2,500,000 particles/0.5 ml not to 250,000 particle/0.5 ml as indicated in the Non-Final Office Action mailed out on 1/27/2010.

The Examiner, respectfully, submits that the "250,000" was a typographical error and the correct number is 2,500,000; however, the range disclosed by Pasqualoni et al. completely encompass the claimed range since it would equate to 0.417 particles/0.5 ml

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to 2,500,000 particles/0.5 ml. While the disclosed range encompasses the claimed range, the reference is seen to make said limitation obvious.

Appellants have argued that the claimed ranges is not obvious in light of the broad range disclosed in Pasqualoni et al. due to the criticality of the claimed range recognized and described in the present application, and they refer to paragraphs [0017], [0025], and [0083] of the present application specification and claim that they demonstrate the criticality.

Nevertheless, it should be noted that after reviewing said paragraphs, a demonstration of any criticality of the claimed range on a possible non obviousness in light of the range disclosed in Pasqualoni et al. is not found.

Appellants have argued that Tamai et al. teach away from the instant application because, as Appellants claim, Tamai et al. in column 4, liens 7-23 disclose that “Because fumed silica having a bulk density smaller than 70 g/L hardly adjust to water and does not disperse in water, such fumed silica hardly crumbles or disintegrates and can be obstacle to a polishing composition with good dispersibility and result in formation of scratches.”

The Examiner disagrees and, respectfully, submits that in fact, column 4, lines 7-14, clearly provides a motivation on why to use fumed silica having bulk density of greater than 70 g/L, **and** the reference discloses, in column 3, lines 11-16 and 40-45, that said invention (i.e. Tamai et al.) uses a bulk density of “at least 70 g/L”.

Appellants have argued that Yamada et al. prefers the use of colloidal silica, and that “the occurrence of scratches I particularly suppressed when colloidal silica is used”.

The Examiner, respectfully, submits that the disclosure of the use of colloidal silica by Yamada et al. is an embodiment of said reference specially in view of the fact that, as to the use of silica, Yamada et al. clearly disclose “colloidal silica or fumed silica” in Abstract. Also, in paragraph [0027], Yamada et al. disclose “When the silicon dioxide contained in the polishing composition is colloidal silica, the average secondary particle diameter DN₄ of the silicon dioxide is 120 nm or less and when the silicon dioxide contained in the polishing composition is fumed silica, the average secondary particle diameter DN₄ of the silicon dioxide is 200 nm or less. This prevents an increase in haze caused by excessiveness of average secondary diameter DN₄ of the silicon dioxide. Additionally prevented is the occurrence of scratches on the surface of the wafer and increase in surface roughness of the wafer, caused by excessiveness of average secondary particle diameter DN₄ of the silicon dioxide.” Thus, Yamada et al. does not link the reduction of occurrence of scratches to only colloidal silica. Furthermore, it is clear that the average secondary particle diameter of fumed silica is 200 nm or less; while the average particle diameter is from 5 to 30 nm (i.e. within the claimed range).

Appellants have argued that Pasqualoni et al. fails to recognize the usefulness or criticality of concentrations at 10% or higher to maintain the aqueous dispersion at a high level over a long term and still obtain a high polishing rate.

The Examiner, respectfully, submits that Pasqualoni et al. clearly disclose a range of 4% to 10%. Furthermore, the instant claim 2 does not recite that their claimed concentration is to "maintain the aqueous dispersion at a high level over a long term and still obtain a high polishing rate". Additionally, even assuming arguendo that the claim had such recitation, the fact that the reference teaches one of the end points in the recited range is seen to make the claimed invention (i.e. claim 2) obvious absence proving the contrary. In other words, how could 10% impart those advantages that Appellants recite that are missing in Pasqualoni et al.; whereas, that same amount (i.e. 10%) disclosed by Pasqualoni et al. cannot impart such advantages (i.e. "maintain the aqueous dispersion at a high level over a long term and still obtain a high polishing rate").

Appellants have argued that the use of at least one hydroxide as that recited in claims 7 and 9 cannot be interpreted as "product-by-process" limitation as that had been interpreted in the Non-Final Rejection mailed on 1/27/2010.

The Examiner, respectfully, submits that "product-by-process" limitation argument was not the only ground that the Examiner relied on to reject claims 7 and 9. In fact, Pasqualoni et al., as clearly had been pointed in page 3, last few lines of the

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Non-Final Rejection, disclose the use of potassium hydroxide (i.e. alkali metal hydroxide). Thus, the reference is seen to clearly meet the limitations of those claims.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Pegah Parvini/

Examiner, Art Unit 1793

Conferees:

/J.A. LORENGO/

Supervisory Patent Examiner, Art Unit 1793

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